

AMENDMENTS TO THE SPECIFICATION

Please replace the following paragraphs.

[0002] The development of offshore gas or gas condensate fields of smaller size has often been considered as unprofitable because the costs of bringing the product therefrom onto the market would have been too ~~[[to]]~~high. Using technologies known thus far often requires complicated preprocessing and production plants for the preparation of products which are more suitable for the transport away from an exploitation field than an unprocessed well stream. In particular it has been common practice to separate liquids and solid particles, and any heavier hydrocarbons, from the well stream and then to process further constituents of the well stream individually, such as the extracted gas.

[0003] An example of the prior art is described in U.S. Pat. Nos. 6,003,603 and 5,878,814, ~~No. 180,469~~ which relates to a method and system for offshore production of liquefied natural gas (LNG), wherein the well stream is supplied from a subsea production plant to a pipeline, in which it is cooled by the surrounding sea water. Then the well stream is supplied to a conversion plant provided on a ship, wherein liquids and solid particles are extracted and at least a part of the remaining gas is converted to liquid form for the transfer to storage tanks on board the ship.

[0005] Furthermore, U.S. Pat. No. 5,199,266 ~~177,071~~ describes a method of dealing with petroleum gas from an oil or gas production field comprising ethane and heavier hydrocarbons, wherein liquids and solids are separated from a well stream and the gas of the well stream is dried, cooled and possibly processed further prior to condensation and the placement of condensed gas ~~gas~~ in storage tanks. In U.S. Pat. No. 6,094,937 describes ~~it is described a~~

method of liquefaction and/or conditioning of a compressed gas/condensate from a petroleum deposit, especially a compressed gas/condensate flow which has been separated from a crude oil extracted from an offshore oil field.

[0006] Using the technologies known thus far and disclosed in the above publications, the feed is in each case subjected to a preprocessing prior to the condensation process itself. In particular it is presupposed that liquids and solids, and any heavier hydrocarbons, are separated in advance. The known techniques referred to all focus on making liquefied natural gas of some quality or other, that may be brought ashore from a location at sea. None of the publications is seen to be concerned with the other constituents of the well stream. According to U.S. Pat. Nos. 6,003,603 and 5,878,814, No. 180,469, for example, the extracted liquids and solids are transferred to a container with no indication as to what is done with the contents of the container when it is full.

[0007] ~~Therefore,~~ Therefore, in such offshore production of liquefied natural gas, there may be a problem in respect of such components that traditionally are extracted, such as oily sands and water, which must be transported away, or otherwise be deposited in situ. Common to the approaches disclosed in the publications above is that they also require costly processing plants, sometimes ~~some times~~ drier/dehydration and regenerator/cleaning systems, too.

[0011] The invention also relates to a system for carrying out the method according to the invention, by employing an expander, a heat exchanger, a mixing vessel and a storage tank, and ~~corresponding preferred embodiments such as indicated in patent claim 8 appended hereto, and preferred embodiments of the invention are indicated in respective ones of the dependent claims.~~

[0012] In the method according to the invention there is no need for the well stream to undergo any form of ~~pre-treatment-preprocessing~~, not even separation. Hence, a processing plant for the implementation of the method may be correspondingly simplified. The method makes it possible to condense an unprocessed well stream into a product comprising a mixture of liquids and solids, i.e. a liquefied unprocessed well stream (LUWS), without any preprocessing of the feed, such as extraction of solid particles, e.g. sands, and removal of water, cleaning and drying.

[0020] This embodiment of the invention illustrated in **FIG. 1** is intended for being used for the condensation of an unprocessed well stream from an offshore gas or gas condensate field. Through a wellhead 1, or a plurality of wellheads interconnected at a collector manifold, gas is produced, the composition, pressure and temperature of which depending on the field concerned. Without any preprocessing or treatment the well stream 2 is led through a cooling loop 3 such that the temperature of flow is kept a few degrees, e.g. 5 °C, -5° C, above the hydrate forming temperature of the well stream. From the cooling loop 3, which may take the form of a coiled pipe on the sea bed, the well stream is fed to a multi-stage expander ~~device means~~-4 which may be a dynamic expander, or the combination of a static and a dynamic expander.

[0022] In the expander 4 the pressure and temperature is gradually lowered such that parts of the well stream is condensed, and liquids are drawn off through draining outlets 5A. The condensation products ~~are drained from the drains are fed to~~ a mixing vessel 6 which ~~is also fed also is supplied~~ with the condensation products from the exit of the expander 5B which on their part ~~are~~ is-cooled to a desirable temperature prior to the mixing by means of a system comprising a heat exchanger 8 and a cooling device 9 included in the process chain. Thus, the product then accumulating in the storage tank 7 is a condensed well stream product, i.e. a liquefied

unprocessed well stream (LUWS) made up of a mixture of condensation products from each of the draining outlets 5A and the expander exit 5B.

[0024] A process according to the method of the invention is now to be explained with reference to FIG. 3 which gives an example of a pressure vs. enthalpy diagram showing the changes in the state of a well stream during the process. In the pressure vs. enthalpy diagram shown the point labeled 6 indicates the state of the well stream at the wellhead 1. The well stream emerging from a gas or gas condensate field is at a high temperature, e.g. 90°C – 99°C ., and a high pressure, which in the diagram shown equals 200 bar. Through the cooling loop 3 the well stream is cooled to a temperature just above the hydrate temperature, corresponding to state 5 in FIG. 3. Then the well stream is expanded isentropically, or near isentropically, to a state 3 in which the pressure is close to that of a storage tank 7.

[0026] The difference between the process according to the invention and the conventional LNG processes is elucidated in FIG. 4. According to the invention the condensation takes place along the solid line linje-(a) in a fully continuous process from wellhead or wellhead manifold to the storage tank 7. On the contrary, the conventional condensation processes take place in a step by step manner and the well stream must undergo a comprehensive preprocessing including separation, drying, cleaning corresponding to points 2 and 4 in FIG. 4, and recompression corresponding to points 3 and 5 in FIG. 4, several times, before it arrives at the storage tank.

[0033] Table 1 relates to an isentropic expansion process under ideal theoretical conditions for a gas comprising about 80% methane, 5% ethane, 2% propane, 2% N_2 , 5% CO_2 , and 6% C_{3+} , and is based on a starting condition corresponding to state 5 in FIG. 3. The table indicates the values

of available energy in the expansion process and the required cooling needed for the condensation of all the fluid, after the expansion, into liquids, for ending conditions corresponding to states 2, 3 of ~~[[og]]~~ 4 in FIG. 3, respectively.